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Aquathermolysis of heavy oil in reservoir conditions with the use of oil-soluble catalysts: part II–changes in composition of aromatic hydrocarbons

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Abstract

© 2018, © 2018 Taylor & Francis Group, LLC. This paper discusses aquathermolysis process of heavy crude oil from Boca de Jaruco reservoir, which is developed by CSS method. The catalysts based on cobalt, nickel, iron and cupper are used to intensify the in-situ conversion processes. The active form of catalysts generates after steam injection. In second part of work the conversion of aromatic hydrocarbons depending on thermo-catalytic conditions and composition of catalysts are investigated. The thermo-catalytic treatment destructs resin and asphaltene molecules. The destruction products transform into aromatic fractions. The correlation between the C4-phenanthrene/naphtabenzothiophen ratio and the yields of aromatics and resins are revealed. The increase in high-molecular aromatic hydrocarbon, particularly tetramethyl-phenanthrene content is observed. However, the content of heteroatom compounds such as naphtabenzothiophen is constant. Based on IR-spectroscopy, the changes in composition of aromatic fraction are revealed. The lowest value of aromaticity index is detected for experiments with only hydrogen donor (without catalysts) and for experiments with Ni-, Cu-based catalysts.

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Keywords

aquathermolysis, aromatic hydrocarbons, catalyst, heavy oil, transition metals

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